PLANS FOR NASA'S DEEP SPACE NETWORK AND POSSIBILITIES FOR PLANETARY PROBE MISSION SUPPORT

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ABSTRACT

NASA's Deep Space Network (DSN) has been a critical part of deep space exploration for more than 45 years. Recently, plans have been put in place ensuring the continued utility of the DSN for the next 20 years. Many of the planned capabilities are of interest to the planetary probe community.

New 34m beam waveguide antennas will be added so that each of the three DSN sites (in the USA, Spain, and Australia) will have the ability to backup the existing 70m antenna at X-band (~8 GHz) for both uplink and downlink. This will increase DSN robustness, removing the 70m antenna as a single point of failure in the system. Ka-band capability (~32 GHz) will be increased at all sites as well. In addition, planning has already begun for the eventual replacement of the 70m antennas in the coming decades.

Some planned capabilities will be especially useful to the planetary probe community. These include arraying of antennas to provide enhanced reception for ciritcal mission communication periods, support of new and emerging communication relay protocols, and increased navigation accuracy.

In addition to enhanced communication and navigation services, planetary probe missions can also take advantage of the unique science capabilities of the DSN, including radio science, radio astronomy, and planetary radar.